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Hyva has added five new 40t/m cranes to its Hyva, F'lli Ferrari and Amco Veba product lines



RIGHT TOOL FOR THE JOB

Loader cranes are the workhorses of the lifting industry covering a wide range of applications from simple deliveries to critical lifts in congested spaces. Will North rounds up some of the latest development and innovations.

Loader cranes are probably the only crane type that is truly mass produced with tens of thousands delivered every year adding to the population of working cranes. They cover a wide range of sizes and types including articulating or telescopic, with take-up depending on the region.

The articulating loader crane is without question a European product, emerging from the Nordic countries with the industry now dominated by manufacturers based in Sweden, Finland, Austria and Italy. The initial driving force behind their take up was probably related to the logging industry in the Nordics and an absence of onsite unloading in Italy.

The telescopic loader crane is popular in Japan and some parts of South Asia. North America is different again with telescopic loader cranes tending to be big to handle jobs such as unloading and placing big cooling /AC units etc... However, over the years these have morphed into boom trucks. Also the varying road regulations and truck designs have also played a part in the design of the cranes.

Although the most popular articulated crane

models are mass produced they have been at the very forefront of technical development, from the clever use of ultra-high strength steels and multi-formed boom profiles to pioneering electronics that make them easier and more forgiving to use while improving speed and capacity even when operated by the most 'ham fisted' of operators. This and other safety requirements have been necessary because, unlike mobile cranes, the operator is first and foremost a truck driver.

While the average loader crane positively bristles with sophisticated but practical technology, manufacturers continue to 'push the envelope' improving capacities, boom lengths and ease of operation, along with reductions in weight and stowed dimensions to keep up with the rapid development of the vehicles they will be mounted on. Here are some of the most recent introductions:

NEW TRI-BRAND CRANE LINE-UP

Hyva has been working on its Edge line of cranes built on a new dedicated line at its facility in Poviglio, Italy, home to its Amco Veba and F'lli Ferrari subsidiaries. The company has added five new cranes in the 40 tonne/metre class: the HC

410, HC 401K, HC 441, HC 405e and HC 445e. The first three new units have classic 430 degrees of slew, while the HC 405e and HC 445e are 360 degree slew models. Versions of these new cranes are also marketed under the F'lli Ferrari 'New Age' line and Amco Veba 'New Generation' range using different model numbers.

The cranes are available with two to eight section booms for a maximum reach of up to 20.9 metres. One model - the HC 401 K - is designed for trucks with a compact wheelbase and features a suitably short boom (designated by the K in its model number). The four other standard boom cranes can all be equipped with 10 metre six section telescopic jibs.

All the cranes include Hyva's 'Magic touch' stowing and unstowing one touch button and the Dynamic Load Diagram (DLD) Simulator allowing the operator to verify the truck's stability and the crane's lifting capacity in advance. The operator positions the stabilisers, inputs the weight of the load and is presented with a display showing the crane's safe working load and allowable reach at all slewing positions.

Operators can consider different ways to set up

the crane in advance using the DLD Simulator, allowing them to find the optimal stabiliser set up for the load and available space on site.

Another digital feature available on these cranes is Hyva's Connectivity 4.0 telematics system. The plug-in system employs a GPS gateway which can be installed at the factory or retrofitted with a SIM card. This allows all sensor information for the crane to be monitored remotely and stored in the cloud so that fleet managers can track utilisation and operation, while technicians are able to provide support without travelling to site. This can particularly save time when reconfiguring the crane.

NEW FASSI TECHNO

Fassi - the third largest loader crane manufacturer after Palfinger and Hiab - is based 170km north of Hyva/Amco Veba in Bergamo. In April it announced the second model in its new Techno range following the launch of the F1450R-HXP last year. The new model, the 132 tonne/metre F1750R-HXP, is well ahead of schedule and now ready for production. It has a maximum capacity of 30 tonnes at up to 4.05 metres radius. With the L826 jib installed the maximum tip height is 35 metres with a capacity of 2.3 tonnes, maximum radius is 31.3 metres with a capacity of 1.6 tonnes. The new crane features Fassi's new decagonal X-Design boom structure, which it claims offers improved performance, particularly when the boom is elevated to higher angles, boosting capacity by up to 57 percent.

The F1750R-HXP Techno is fitted with two designated CANbus/ethernet lines, which allows it to use Fassi's FX Link system which "deeply integrates crane and truck controls" allowing operators to monitor the crane's status from the truck's dashboard, and drive the chassis from the crane's remote controller. This can save time repositioning the crane onsite and reduces the need to enter and exit the cab, but also to stand back when manoeuvring through tight spots.

The new crane is designed for regular use with a winch, which can be easily installed or removed and stowed along with boom and jib making it a useful bit of kit for those buyers who want to use it for taxi crane work.

EFFER TRIO

Another Italian crane company Effer - now part of Hiab - has built a reputation for its larger cranes. This summer, the company launched three new cranes ranging from the 32 tonne/metre iX.355 HP, through to the 51 tonne/metre iX.550 HP up to the 110 tonne/metre iQ.1200 HP. The new models fill out the Effer range currently topped by the Effer 2755 which has a maximum capacity of 49 tonnes.

The new models have been designed with weight and fuel efficiency in mind. This approach has also paid off in terms of available cargo payload. The largest of the three new models - the iQ.1200 HP - performs well for its rating but is closer to a 90 tonne/metre crane when it comes to dimensions and weight.

The new cranes use Hiab's new SPACEvo control system, said to enable precise operation, even when working at high speeds. It also employs the company's VSL+ stability system, which



Fassi's new F1750R-HXP Techno



Hiab has launched three new Effer cranes

considers both stabiliser position and total truck weight when calculating lifting capacity.

FASTER EASIER INSTALLATION

Many of the features from the big Effer were developed for the similar Hiab IQ.1188 HiPro, launched late last year with the first unit delivered to Dutch customer Van Der Sluis Transport in March. The engineers and technicians at Hiab's



Van Der Sluis Transport's new IQ.1188 was mounted using Hiab's Frameworks system

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LTM 1110-5.2 with LICCON3

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factory installation centre in Meppel used Hiab's Frameworks subframe system, which uses pre-manufactured, bolted, components in place of custom built subframes, speeding up installation and optimising performance. Hiab says an installation using Frameworks can be completed in a quarter of the time, while increasing the overall stability of the crane by up to 40 percent. For Van Der Sluis, the Meppel team installed a Hiab IQ.1188 HiPro with a nine extension second boom and six extension jib with one manual extension on a Scania truck. Hiab says that the V12 Power boom design used on this crane minimises boom deflection, even at the crane's maximum 42 metre radius.

SWING DOWN JACK CLEARANCE

A recent retrofit option from Danish manufacturer HMF shows how small changes can make a difference to crane operators. Customer Tim Jespersen and his brother Paw of Danish transport company Svenstrup Vognmandsforretning run seven HMF cranes in their fleet, the largest of which is a 58 tonne/ metre 7020-K equipped with a 1400-K6 jib.

The problem Jespersen faced with this crane was its compression rod. This is the mechanism which as the stabiliser jack is raised, kicks the leg up making it easier to raise into the stowed position. Its normal configuration prevents the jack from fully retracting. When swinging the stabiliser down, or extending it out, the leg could be blocked by obstacles, such as a kerb. A lock screw on the compression rod allows it to be



A redesigned compression rod makes it easier for the stabiliser jacks to swing down and extend on uneven ground



shortened, but if it is not loosened again before stowing, the entire rod could be damaged. Much of Svenstrup's work takes place on uneven construction sites, with many obstacles to clear

when extending the outrigger beams. Jespersen raised his concerns with HMF, which worked with him to develop a practical solution. The company now offers a three part compression



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rod, available for retrofit, which is secured in the extended position with a clip, rather than a screw. Svenstrup had already devised its own solution, but Jespersen said: "It's great to have a factory solution and know that things are working as they should and that it can also be serviced by skilled people who know the products."

The new rod design allows the jack to be fully retracted for greater ground clearance when swinging down or extending the beams.

QUIET AND CLEAN

For many customers, being able to use their cranes silently and without emissions is an increasingly important requirement. This can allow for early morning deliveries to urban sites without disturbing residents. It also allows the

crane to for work on sites where customers or local authorities demand emission free working.

FASSI SHT

Increasingly, crane manufacturers are meeting this demand with systems that allow the crane to work from electric power. Fassi's solution, launched last October, is known as SHT (Smart Hybrid Technology). This consists of a 560Ah battery pack which can be recharged from the chassis engine when travelling, or from a 16 amp single-phase power source easily found on most job sites. The batteries will also recharge at the same time. When power isn't available, the crane can be simply switched to traditional working from the truck PTO.

If the crane returns to the depot with the batteries

fully discharged it takes around nine hours to reach 100 percent - a full recharge takes just five hours using the chassis engine/PTO - however given the way loader cranes are used it is unusual for that they would be fully discharged.

The entire system is designed for efficiency, both in terms of fuel use and payload. In total with batteries, the entire system weighs 550kg and includes a second steel case with the motor and variable displacement hydraulic pump. The AC motor generator, used to charge the batteries while on the road, weighs just 22kg.

Further efficiency is achieved by the software supplied with the crane. This maximises the efficient use of electric power, while reducing hydraulic power loss. The SHT design was first installed on the company's F345RB.2.26 L214 crane, however, Fassi says, it is suitable for any crane up to 40 tonne/metres and could be adapted for other models. The first two cranes to use the system, both F345RBs mounted on a Volvo chassis, were delivered to Hellerød Transport in Norway last year by local distributor Nord Kran. Hellerød has been using the cranes around the Oslo area.

HIAB HVO SOLUTION

Hiab was an early pioneer of electric lifting with its ePTO system. In the UK, transport specialist RT Keedwell Group and its client aircrete block manufacturer H+H Celcon, commissioned two prototype drawbar trucks with electric cranes to reduce the environmental impact on deliveries to customers within London's M25 orbital motorway.



Nord Kran supplied the first two Fassi cranes with SHT electric lifting to Hellerød Transport in Norway

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They turned to Massey Truck Engineering to develop the trucks with Hiab X-Hiduo 158B-2 cranes. The bodybuilder selected two Renault C380 trucks for the project, and then set about modifying them to ensure maximum payload. The trucks, used for local deliveries, were supplied with lighter weight day cabs. The passenger seat was also removed, along with other details to further reduce the weight. Massey managed to achieve a 28 tonne available payload on a drawbar combination. The trucks are fitted with a Renault DTi Euro VI engine fuelled by HVO which is said to reduce harmful emissions by as much as 90 percent.

RT Keedwell director Stuart Keedwell said: "What sets these vehicles apart from others is the lightweight chassis and innovative design of the whole build, which means the customer can carry more product and therefore be more efficient and profitable. We're delighted with the outcome so far and look forward to monitoring the performance over the coming months.



Massey Truck Engineering installed Hiab X-Hiduo 158B-2 cranes on two drawbar trailers, optimising payload for deliveries of Celcon blocks

"These vehicles are truly one of a kind, with a 28t payload using a 26t drawbar combination. There is nothing quite like them currently in the UK. The weight reduction gives a significant additional

load carrying capacity over the current standard trucks and a consequential reduction in delivery cost which has been used to offset the additional HVO cost." ■

TELESCOPIC ALTERNATIVES

While knuckleboom cranes dominate the European loader market, straight boom telescopic loaders - or cargo cranes - have always been the tool of choice in Japan and other countries in the region. Tadano's latest loader crane, the new 12 tonne TM-ZX1200 series which includes three variants - the HRS, HS, and MH - narrows the gap between its 10 tonne TM-ZX1000 and 15 tonne TM-ZX1500 series.

The HRS and HS units offer Tadano's AML overload system with Safety Eyes, a system which calculates the crane's capacity in real time, monitoring the load on the hook and carried by the truck during deliveries - with capacities reduced as the crane is unloaded and ballast provided by the load is reduced. The higher end HRS system improves feedback to the operator with a colour LCD radio controller that displays the lifted load, allowing the operator to move with the load. At the other end of the scale, customers who prefer a more conventional and economic approach, the MH line includes more basic safety devices which monitor the load moment, cutting out at pre-determined points and unlike the more advanced system does not optimise capacities.

Stability is improved by a new, wider, 5.5 metre stabiliser base compared to 5.2 metres on the 10 tonne crane. In more restricted sites, outriggers

can be deployed at 2.3 or 3.9 metres, with the crane's capacity adjusted accordingly. Typically, these cranes are used with only front stabilisers, but rear stabilisers are available as an option.

The HRS models can also be used with a full aerial work platform programmed into the control system. The new cranes also include improvements to the basic structure, including a new lighter stronger post with pentagonal design, a slew ring cover that can be attached and detached without tools, and a boom design that allows easier inspection of the internal wire ropes used to extend the boom. ■



The TM-ZX1200 work platform option



Tadano's new TM-ZX1200



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The Rothen Group's new crane boat, Oxford, carries a HMF 1120 crane, with outrigger legs



Many of the group's jobs take constricted working to a new level

CANAL CRANES

The Rothen Group uses boat mounted cranes for its work helping maintain the UK's canals. Founder Ian Rothen explained to Will North how it handles the challenge of stabilising cranes on these unusual installations.

Ian Rothen's family has been involved with canals for 50 years. He founded The Rothen Group to offer marine equipment rental and a range of contract services. Operating the largest fleet of inland waterway crane boats in the UK, it combines detailed knowledge of canal infrastructure and equipment to carry out lifting works at logistically complex sites.

I first encountered the group's work when Rothen posted a picture of his latest crane boat, Oxford, on social media. It raised an immediate question, for me - how do you stop a knuckleboom crane from tipping when one set of legs is on a canal bank, and the other in the muddy, uncertain depths of the canal's bed?

A good starting point for assessing the safety of any innovation is to compare it to the alternatives. Is this working method justified by its reduction in risk compared to other methods?

"Canals and rivers are mainly in rural locations," says Rothen. "Land based equipment faces access issues such as a lack of road links and sometimes work can only take place using floating equipment, including boat cranes. On urban projects, canal or riverside land may have already been developed for other purposes, reducing the space available for land based cranes. Many historic wharves have been sold off and dismantled, making it harder to move materials from boats to sites."

"Boat mounted cranes have taken the place of gantry cranes, historically used for lifting operations. This is due to the adoption of safer

working methods and new safety conscious legislation. Gantries are increasingly deemed unsuitable. A boat mounted crane can operate as an 'all in one solution', not only able to lift, load and transport materials to and from the project, but also to provide staff welfare and storage facilities."

But how do you keep them level? Traditional crane operators are used to the challenges of stabilising a crane on a standard construction or industrial site, but how do you assess the ability of a canal bed to support such a crane?

Not every crane boat requires stabilisers for every lift. "The main considerations include the size and width of the vessel in relation to the waterway, and whether it can carry out lifting operations without the use of stability legs. It is with this in mind we employ marine architects to carry out inclined plane tests. By using weights and measuring the degree at which the vessel lists, a computer generated model can be produced to gauge whether lifting is possible without stabilisers. Results vary from vessel to vessel, and stability can be improved by adding ballast to change the centre and vertical plane."

"Vessels without stability legs will be fitted with a heel degree instrument. When the vessel has reached its maximum safe heel - the sideways inclination angle - an alarm will sound, or the crane will only let you retract the lifted load."

When stabilisation is needed, two options are available. "Vertical jacks with pads of up to a metre square which are firmly deployed on the



waterway bed. This set-up is similar to ocean going 'jack up vessels', in which the jacks can lift the boat out of the water but is only possible at pre-set inboard spacings. Outrigger type legs excel in providing a wide footprint for good lateral stability. However, unlike their vertical counterparts, they cannot be used to lift boats out of the water."

Outrigger type stabilisers just need to prevent the boat tipping, but still must not punch through the canal bed. How does Rothen ensure they are well supported?

"This is a key consideration when conducting lifting operations on the water," he says. "Working with unknown ground bearing pressures can raise concerns of potential damage. We have worked closely with naval architects and developed a formula for estimating ground bearing pressures passing through a vessel's stability legs and onto the canal bed."

As with any safety analysis, Rothen must consider worst case scenarios such as the entire lift being supported on one leg. "We carry out calculations based on this possibility, and also look to estimate canal bed density via probing rods before carrying out works, as this can vary greatly. Alongside this, we can use larger footplates to reduce force exerted through the stability legs." ■



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